Biodiversity of the Waikanae River

Information review

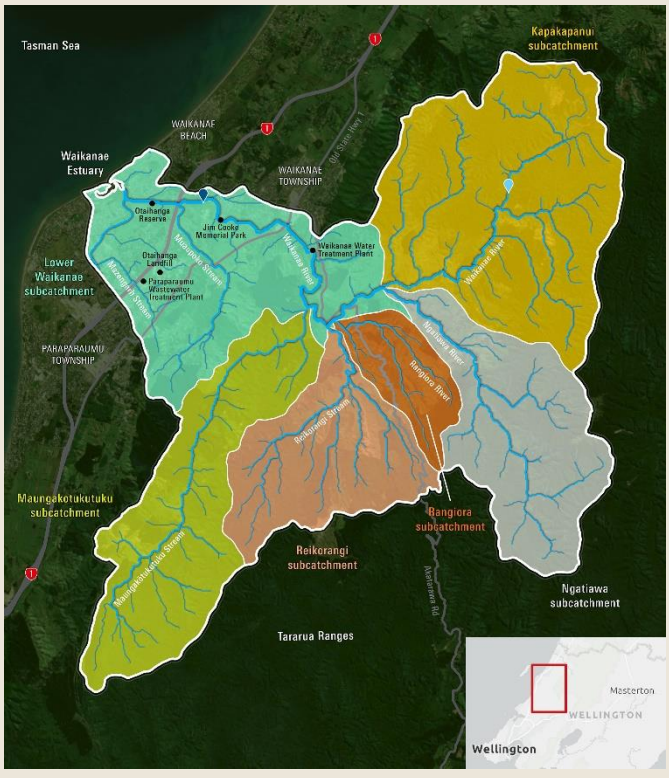
This document is a summary of a 2021 report by EOS Ecology that reviewed existing written records about the biodiversity of the Waikanae River catchment. It covered the area's history, species, known issues and noted recommendations for future work.

The review was funded by DOC's Ngā Awa River Restoration Programme.

History and changes in land use

Before European settlement the Waikanae River flooded into areas of swamp forest, wetlands, open water and raupō swamp. The catchment also included a large area of sand dunes. From the 1880s, much of this land was cleared, drained and levelled for housing and farming.

Land cover in the catchment in 2021 was 59% native forest and shrubland, 21% farming, 15% forestry and 4% urban.



Waikanae River looking towards its source in the Tararua Ranges. *Image: Nicholas Cull*

Fish species and locations

The New Zealand Freshwater Fish Database has records for 22 fish species in the catchment. Longfin eel, kōaro, redfin bully and brown trout are the most widespread. Shortjaw kōkopu, torrentfish and kōura are present in 3 of the 6 subcatchments. Lamprey have been found in the lower river and in the headwaters.

Giant kōkopu, brown mudfish, īnanga, lamprey giant bully, yelloweye mullet, common smelt, black flounder, rainbow trout, brook char, goldfish and freshwater shrimp were only found in the lower reaches.

Īnanga are only present in the lower river and tributaries because they cannot climb waterfalls or swim through swift rapids. A 2016 survey found only a small spawning area and low numbers of eggs.

Trout numbers peaked in 2011 and 2013, and there are less than 20 trout per kilometre in the river. A 2019 study found that trout were spawning in the river.

The only recorded pest fish species is goldfish in 2020–2021. This may be because the catchment has been poorly surveyed rather than no pest fish species being present.

Fish passage

The Fish Passage Assessment Tool has records of 154 structures in the catchment that were a risk to fish passage. These were mostly bridges, culverts, weirs and flap gates, with 15 culverts having a high or very high risk.

Kōura and kākahi

Kōura (freshwater crayfish) are present but are recorded infrequently in surveys.

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Kākahi (freshwater mussels) were seen in the Muaupoko Stream in 2021 and their presence was confirmed by eDNA in June 2022.

Invertebrates as a measure of health

Two river sites are monitored annually for macroinvertebrates (bugs visible with the naked eye) by Greater Wellington Regional Council.

The upper site (Mangaone Walkway) had a macroinvertebrate community index (MCI) of between 130 and 145, indicating pristine conditions with almost no pollution. The lower site (Greenaway Road) had an MCI of between 105–129, indicating mild pollution.

Tributaries ranged from pristine condition (Maungakōtukutuku Stream) to severe pollution (Muaupoko and Mazengarb Streams). Overall, the MCI scores showed the river has high ecological values compared with others in the region.

Urban development around the Waikanae Estuary

Waikanae Estuary near Waimanu Lagoon. *Image: DOC*

Housing near the estuary has been enabled by substantial flood protection works along the lower river. Urban development has also resulted in extensive reduction and modification of large areas of coastal wetland.

Water treatment and bore water recharge system

The Waikanae Water Treatment Plant provides water to Waikanae, Paraparaumu and Raumati. Groundwater from a bore tops up the river to maintain a minimum flow of 750 L/s.

Adding bore water changes the chemical signature of the water. This may discourage migratory species like kōkopu and īnanga from swimming upstream from the sea. Fish surveys have been set up to find out if this is happening.

Water quality

Water quality in the Waikanae River is in the top 25–50% of water quality monitoring sites in New Zealand, but declines downstream. Wastewater from Waikanae, Paraparaumu and Raumati is treated at the Paraparaumu Wastewater Treatment Plant before being discharged to the Mazengarb Stream.

Untreated wastewater occasionally enters this stream during storms, and it carries runoff from the Paraparaumu landfill. Water quality in the estuary has declined since monitoring began in 2010.

Gravel, sediment and mud are building up in the estuary

Gravel tends to build up in the lower reaches of the river. Historically, this was removed to maintain the riverbed at its 1991 level and reduce the risk of flooding.

Soil and fine sediment from rural and urban land is accumulating in low-flow areas of the estuary. From 2010 to 2020 an average of 16.6 mm/year of sediment was deposited in the upper estuary. This is well above its natural state, which is estimated at 9mm/year.

Mud (very fine particles) has made up more than 25% of the sediment for at least one sampling site in the estuary since 2018, leading to a ‘poor’ condition rating.

Aerial photos showing changes to the estuary and encroachment of urban development 1942–1991. *Images https://retrolens.co.nz*

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The estuary is also moderately enriched with nutrients (nitrogen and phosphorus) but has low toxicity.

The upper estuary is rapidly filling with sediment, causing the loss of seagrass, saltmarsh and habitat at its edges. This is likely to reduce the area's habitat and biodiversity in the future. Sea-level rise is also expected to cause more sediment build-up as more energy will be needed to move it out to sea.

Sediment comes from farmland and forestry, particularly after trees are harvested, as seen on these hills. Stormwater from urban areas also carries sediment into the estuary. *Image: EOS Ecology*

Birds found in the catchment

Waikanae Estuary is a bird hotspot that ornithologists have visited since the 1870s. It supports 13 Nationally Threatened or At Risk bird species, including breeding populations of North Island fernbird and New Zealand dotterel. The estuary is a stopover site for migrating birds including bar-tailed godwit.

The New Zealand eBird database has records of 95 species observed at Waikanae Estuary. Waikanae River reserve also has many different birds, with 28 species recorded in a 2007 survey.

Bar-tailed godwits are regular visitors to Waikanae Estuary in summertime. *Image: Patrick Kavanagh*

Recommendations for future research

- Survey fish in Ngatiawa, Rangiora and Reikorangi subcatchments.
- Sample the whole catchment and estuary with eDNA.
- Set up new macroinvertebrate survey sites so the benefits of restoration work can be tracked.
- Identify īnanga spawning sites.
- Research catchment pollution especially on land used for farming and forestry.
- Identify and manage the sources of fine sediment so restoration can be targeted.
- Set up an electronic reference library for relevant local biodiversity resources.

Review reference

Waikanae River catchment & estuary: Biodiversity information review, summary of pressures, and recommendations. Dewson, Z. 2022. EOS Ecology Report No. DEP01-22005-01. 44 p. (add link)

Mab of subcatchments provided by EOS Ecology.

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